REMARKS

Claims 1-107 were pending. Claims 5, 7, 8, and 17-89 have been withdrawn from consideration. Claims 1, 5-8, 11, 17, 29, 35, 41-48, 59-60, 79, and 100-107 have been amended. Claims 2-4, 12-13, 25-27, 33, and 39 are canceled. Claims 1, 5-11, 14-24, 28-32, 34-38, and 40-107 are pending.

Claims 1-4, 6, 11-16, and 100-107 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. application No. 2002/0168820 to Kozicki et al. This rejection is traversed.

Claim 1 has been amended to include subject matter from canceled claim 4, and recites a method of forming a chalcogenide comprising device. The method includes "forming a first conductive electrode material on a substrate, and forming a metal doped chalcogenide comprising material over portions of the first conductive electrode material, the chalcogenide comprising material comprising the metal and A_xB_y, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table, the metal doped chalcogenide comprising material having an outer surface, the outer surface having an uneven surface characteristic." The method also includes "forming a discontinuous layer of passivating material over portions of the outer surface of the metal doped chalcogenide comprising material," and "depositing a second conductive electrode material over the metal doped chalcogenide comprising material and the passivating material, and forming the second conductive electrode material into an electrode of the device." The discontinuous layer of passivating material "is sufficient to improve the uneven surface characteristic such that after subsequent deposition of the second conductive electrode material on the outer surface, the chalcogenide comprising material is protected from being etched."

Kozicki et al. discloses methods of forming a buffer layer or barrier layer 155, 255 in a chalcogenide comprising device. The layer is used to prevent thermal diffusion in a chalcogenide-based device, for example. Kozicki et al. does not teach or suggest "forming a discontinuous passivating material over portions of the outer surface of the metal doped chalcogenide material." Kozicki et al. does not anticipate claim 1 of the present application. Claim 1 and its dependent claims 6, 9, 10, and 90-96 are submitted as patentable over the Kozicki et al. reference.

Claim 11 has been amended to include subject matter from canceled claim 13 and recites a method of forming a chalcogenide comprising device that includes forming a first conductive electrode material on a substrate, and forming a metal doped chalcogenide comprising material over the first conductive electrode material, the chalcogenide comprising material comprising the metal and A_xB_y, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table, the metal doped chalcogenide comprising material having an outer surface with an uneven surface characteristic. The method further includes "forming a discontinuous layer of passivating material on the outer surface of the metal doped chalcogenide comprising material by exposing the outer surface to an atmosphere having a temperature elevated from ambient room temperature," "depositing a second conductive electrode material over the metal doped chalcogenide comprising material and the passivating material," and "forming the second conductive electrode material into an electrode of the device." The discontinuous layer of passivating material "is sufficient to improve the uneven surface characteristic such that after subsequent deposition of the second conductive electrode material on the outer surface, the chalcogenide comprising material is protected from being etched."

Kozicki et al. discloses forming a *barrier* layer 155 that prevents thermal diffusion in a chalcogenide-based device, for example. Kozicki et al. does not teach or suggest "forming a discontinuous passivating material on the outer surface of the metal doped chalcogenide material." Kozicki et al. does not anticipate claim 11 of the present application. Claim 11 and its dependent claims 14-16 and 97-99 are submitted as patentable over the Kozicki et al. reference.

Claim 100 recites a method of forming a chalcogenide comprising device by "forming a first conductive electrode material on a substrate" and "forming a metal doped chalcogenide comprising material over the first conductive electrode material, the chalcogenide comprising material comprising the metal and A_xB_y, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table, the metal doped chalcogenide comprising material having an outer surface, the outer surface having an uneven surface characteristic." The method also includes "forming a discontinuous layer of passivating material over portions of the outer surface of the metal doped chalcogenide comprising material," "depositing a second conductive electrode material over the metal doped chalcogenide comprising material and the passivating material, and forming the second conductive electrode material into an electrode of the device." The discontinuous layer of passivating material "is sufficient to improve the uneven surface characteristic such that after subsequent deposition of a second conductive electrode material on the outer surface, the chalcogenide comprising material is not exposed through the second conductive electrode."

Kozicki et al. discloses forming a *barrier* layer 155. The layer prevents thermal diffusion, for example, in a chalcogenide-based device. Kozicki et al. does not teach or suggest "forming a discontinuous passivating material over portions of the outer surface of the metal doped chalcogenide material." Kozicki et al. does not anticipate claim 100 of

the present application. Claim 100 is submitted as patentable over the Kozicki et al. reference.

Claim 101 recites a method of forming a chalcogenide comprising device. The method includes "forming a first conductive electrode material on a substrate," and "forming a metal doped chalcogenide comprising material over the first conductive electrode material, the chalcogenide comprising material comprising the metal and A_xB_y, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table, the metal doped chalcogenide comprising material having an outer surface with an uneven surface characteristic." The method also includes "forming a discontinuous layer of passivating material on the outer surface of the metal doped chalcogenide comprising material," "depositing a second conductive electrode material over the metal doped chalcogenide comprising material and the passivating material," and "forming the second conductive electrode material into an electrode of the device." The discontinuous layer of passivating material "is sufficient to improve the uneven surface characteristic such that after subsequent deposition of the second conductive electrode material on the outer surface, the chalcogenide comprising material is not exposed through the second conductive electrode."

Kozicki et al. discloses forming a *barrier* layer 155, which is used to prevent thermal diffusion in a chalcogenide-based device. Kozicki et al. does not teach or suggest "forming a discontinuous passivating material on the outer surface of the metal doped chalcogenide material." Kozicki et al. does not anticipate claim 101 of the present application. Claim 101 is submitted as patentable over the Kozicki et al. reference.

Claim 102 recites a method of forming a chalcogenide comprising device that includes "forming a first conductive electrode material on a substrate," and forming a metal doped chalcogenide material comprising germanium and selenium over the first

conductive electrode material, the metal doped chalcogenide material having an outer surface, the outer surface having an uneven surface characteristic. The method includes "forming a discontinuous layer of passivating material over portions of the outer surface of the metal doped chalcogenide material," and "depositing a second conductive electrode material over the metal doped chalcogenide material and the passivating material." The method also includes "forming the second conductive electrode material into an electrode of the device." The discontinuous layer of passivating material is sufficient to improve the uneven surface characteristic of the outer surface.

Kozicki et al. discloses forming a *barrier* layer to prevent thermal diffusion in a chalcogenide-based device. The reference to Kozicki et al. does not teach or suggest "forming a discontinuous passivating material over portions of the outer surface of the metal doped chalcogenide material." Kozicki et al. does not anticipate claim 102 of the present application. Claim 102 and its dependent claims 103 and 104 are submitted as patentable over the Kozicki et al. reference.

Claim 105 recites a method of forming a chalcogenide comprising device. The method includes "forming a first conductive electrode material on a substrate," "forming a chalcogenide layer comprising a metal doped germanium and selenium chalcogenide over the first conductive electrode material, the chalcogenide layer having an outer surface with an uneven surface characteristic," and "forming a discontinuous layer of passivating material on the outer surface of the metal doped chalcogenide layer." The method also includes "depositing a second conductive electrode material over the metal doped chalcogenide layer and the passivating material, and forming the second conductive electrode material into an electrode of the device." The discontinuous layer of passivating material "is sufficient to improve the uneven surface characteristic."

Kozicki et al. discloses forming a chalcogenide comprising device having a *barrier* layer 155 that prevents, for example, thermal diffusion in the chalcogenide-based

device. Kozicki et al. does not teach or suggest "forming a discontinuous passivating material on the outer surface of the metal doped chalcogenide material." Kozicki et al. does not anticipate claim 105 of the present application. Claim 105 and its dependent claims 106 and 107 are submitted as patentable over the Kozicki et al. reference.

Claims 9-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kozicki et al. Claims 9 and 10 depend from claim 1, which is submitted as patentable over the cited reference to Kozicki et al. As noted above, Kozicki et al. teaches away from forming a discontinuous layer of passivating material. Claims 9 and 10 are not rendered obvious by the Kozicki et al. reference.

Claims 90-99 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kozicki et al. in view of Applicant admitted prior art. Claims 90-96 and 97-99 depend from claims 1 and 11 respectively. Claims 1 and 11 are submitted as patentable over the cited reference to Kozicki et al., which discloses a thermal diffusion barrier. Applicant's allegedly admitted prior art does not cure the deficiencies of Kozicki et al. The alleged Applicant's admitted prior art has been cited as disclosing an uneven surface characteristic in the form of nodules. The alleged Applicant's admitted prior art, taken alone or in combination, does not teach or suggest "forming a discontinuous layer of passivating material over portions of the outer surface of the metal doped chalcogenide comprising material," as recited in claim 1. Similarly, the asserted admitted prior art, taken alone or in combination, does not teach or suggest "forming a discontinuous layer of passivating material on the outer surface of the metal doped chalcogenide comprising material," as recited in claim 11. Claims 90-99 are submitted as patentable over the cited references to Kozicki et al. and the alleged admitted prior art.

Consideration of withdrawn claims 5, 7, and 8, which are dependent on claim 1, is requested. Claim 1 is submitted as generic and allowable.

Withdrawn independent claims 17, 29, 35, 41, and 79 have been amended to recite formation of a discontinuous layer. Claim 1 also recites a discontinuous layer, and is submitted to be generic and allowable. Consideration of the withdrawn independent claims, and claims dependent thereon, is requested.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

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